Humble S, Dixon P.

The effects of schooling, family and poverty on children's attainment, potential and confidence – evidence from Kinondoni, Dar es Salaam, Tanzania.

***International Journal of Educational Research* 2017, 83, 94-106.**

DOI link to article:

http://dx.doi.org/10.1016/j.ijer.2017.03.001

Date deposited:

23/03/2017

International Journal of Educational Research 83 (2017) 94–106

Contents lists available at ScienceDirect

International Journal of Educational Research

journal homepage: www.elsevier.com/locate/ijedures

The effects of schooling, family and poverty on children's attainment, potential and confidence—Evidence from Kinondoni, Dar es Salaam, Tanzania

Steve Humble, Pauline Dixon*

Newcastle University, UK

ARTICLE INFO

Article history:
Received 5 January 2017
Received in revised form 26 February 2017
Accepted 5 March 2017
Available online xxx

JEL Classifications:
I25
I24
O15

Keywords:
Poverty
Tanzania
Attainment
School and family environment
Sub Saharan Africa
Logistic and linear regression

ABSTRACT

This paper investigates whether pupil's attainment, attitude and self-confidence are associated with teacher beliefs, experience, school characteristics, background and wealth. Data gathered from 1857 poor children living in Kinondoni, Tanzania included test scores, household data, school and teacher information as well as teacher and peer perceptions. Some results are expected, test scores being significantly and positively correlated, teachers identifying good readers as high ability, and peer and teacher nomination around student ability showing significant levels of concordance. Children from wealthier households are less likely to score higher on tests apart from reading. Teacher experience negatively affects all scores apart from Kiswahili. In general school and teacher factors have a negative affect on children's self confidence and positive attitude to learning.

1. Introduction

In developing country contexts research shows that children from poorer backgrounds are disadvantaged concerning their development, learning and attaining potential (Bradley & Corwyn, 2002; Kamper & Mampuru, 2007; Kamper, 2008; Powers, 1996; Zorn and Noga, 2004). Kay (2000) suggests that 'children are simply much more likely to achieve success if they come from a certain type of family' (p. 151). There seem to be three main reasons provided for this assumption. First, that poor parents have a limited amount of time to spend with their children, partly due to the lack of financial resources and the need to deal with day-to-day basic survival issues (Bradley, Rock, Caldwell, Harris, & Hamrick, 1987; Coleman, 1969; Gottfried, Gottfried, Bathurst, & Guerin, 1994; Murphy, 1986; Robinson, Lanzi, Weinberg, Ramey, & Ramey, 2002; Rosenbaum, Kuliek, & Rubinowitz, 1987; Sampson, 2002). This lack of time heightened by the inability of poor parents to provide support owing to their own levels of attainment hampers nurturing from within families. Indeed this is found to be the case around the growth of reading trajectories in a longitudinal study in the US carried out with young children from kindergarten to 3rd grade (Aikens & Barbarin, 2008). Second, poverty impacts negatively on children's motivation. A study from Zimbabwe with children from poor families aged 9–12 years shows that personal beliefs about capabilities influences

* Corresponding author at: Newcastle University, ECLS, King George VI Building, Newcastle Upon Tyne, NE1 7RU, England, UK.
E-mail addresses: steve.humble@ncl.ac.uk (S. Humble), pauline.dixon@ncl.ac.uk (P. Dixon).

http://dx.doi.org/10.1016/j.ijer.2017.03.001

their motivation and learning (Gwirayi & Shumba, 2007). Student's personal beliefs about their own capacity and self-esteem have been shown to impact greatly on motivation and hence learning in school. Studies from South African townships with undergraduates show correlations between hope and motivation (Maree, Maree, & Collins, 2008). Poverty cultivates inequalities in aspirations with higher proportions of poor children believing they are unable to achieve. A study from nine provinces in South Africa with 4409 young people between the ages of 12 to 22 years, shows that marginalized groups lack confidence in their futures being unable to achieve the objectives and goals they set themselves (Leoschut, 2009). In some poor context girls rate themselves more motivated than boys possibly owing to the need to assert their position in a traditionally male dominated society (Furnham & Akande, 2004). Third the attitudes of the schooling community (at both primary and secondary levels) towards children living in poverty where schoolteachers have become demotivated, are typically absent and have removed themselves from their educationalist roles and responsibilities, allows children to be left in teacher-less classrooms to idle the day away without learning (Chireshe & Shumba, 2011; Dixon, Humble., & Counihan, 2015; Dixon, 2012; Frasier, 1987; Humble 2015; Iyer & Nayak, 2009; Kremer, Muralidharan, Chaudhury, Hammer, & Halsey Rogers, 2006; Tooley, 2009). Poverty then impacts on family nurturing, children's motivation and learning in school. The consequences therefore are of disadvantage. According to Bloom (1985) there is:

'strong evidence that no matter what the initial characteristics (or gifts) of the individuals, unless there is a long and intensive process of encouragement, nurturance, education and training, the individuals will not attain extreme levels of capability' (Bloom, 1985; p. 3).

The beliefs of teachers, families and children themselves around capabilities and ability are far reaching. There are a number of studies that show children throughout the age range (4–18 years) from poor backgrounds are greatly underrepresented when it comes to extra curricula or enrichment programmes (Bernal, 2002; Lee, Matthews, & Olszewski-Kubilius, 2008; Worrell, 2007; Wyner et al., 2007). Teacher nomination tends to focus on children who are good readers with good comprehension skills, memory and advanced vocabulary. Children from illiterate homes are thus disadvantaged (Hernández-Torrano, Prieto, Ferrándiz, Bermejo, & Sáinz, 2013; Hodge & Kemp, 2006; Siegle, Moore, Mann, & Wilson, 2010). Card and Giuliano (2013) state that when the identification process for potential giftedness within the elementary school system in the US changed to a universal screening programme the impact on racial equity was large. 130 per cent and 80 per cent more Hispanic and Black students respectively were entering gifted programmes in the third grade. According to Card and Giuliano their 'study suggests that there is a lot of talent out there that people are missing' (2013, p. 23). Indeed Colombia University through their Project Synergy programme worked with parents and teachers to identify ways of recognising high ability children from disadvantaged backgrounds in alternative ways. However owing to the time and labour intensiveness of the procedures of identification the practicality of carrying out such processes is questioned in a typical school setting (Borland & Wright, 1994; Wright & Borland, 1993).

With the lack of nurturing at school, and the inability of illiterate parents to support their child, underachievement (failure to develop or utilse latent potential) may ensue. That is children will fail to self actualize (Reis & McCoach, 2000). This can translate into poor student attendance and increased dropout rates (UNESCO, 2011). UNESCO (2011) state that in Tanzania graduation is low and examination pass rates are dropping at both the primary and O-Level standards. According to BEST.[1] (Basic Education Statistics Tanzania) around 60 per cent of children made the transition from primary to secondary education passing the Primary School Leaving Exam. However, only 23 per cent complete the last grade of the secondary school cycle.

Where teachers support students within their classroom environment it has been shown that this can lead to improved academic and social outcomes for the child including poverty, fertility and maternal and child health. This in turn leads to better consequences around employment and achievement potential (Baker, Grant, & Morlock, 2008; O'Connor, Dearing, & Collins, 2011; Silver, Measelle, Armstrong, & Essex, 2005).

When activities and opportunities arrive within schools and peers are involved in the nomination process these are often associated with mutual beneficial goals and friendship links (Heyman & Dweck, 1998). However, peer and teacher nominations do show statistically significant correlation suggesting children and teachers alike have preconceived ideas and belief structures around capabilities and ability (Blackshear, 1979; Kaya, 2013).

This research therefore explores some of the issues highlighted by previous research around the influences (if any) of family and school environment on children's achievement and the likelihood of being identified for enrichment programmes or extra curricula activities. Children from poor areas need to receive appropriate schooling or support from teachers and family in order to reach their potential. The literature reviewed here has highlighted two major issues: that poverty can affect children's confidence, motivation and achievement and that teachers often believe that poor children, typically first generation learners, are incapable of reaching their potential. Therefore the questions to be explored around these issues are:

- How closely do the teachers identification of high ability children correspond to test scores?
- Does the likelihood of being identified as being high ability in a school context vary according to family background and school characteristics?
- How much variation in attainment is seen across schools and how much of the variation is associated with pupil and school characteristics?

[1] http://www.pmoralg.go.tz/noticeboard/tangazo-1023-20141229-Basic-Education-Statistics-BEST/.

2. Method

2.1. Research context

The research took place in Kinondoni, a poor municipality in northern Dar es Salaam. The areas chosen to carry out the research were the poorest of Kinondoni, which lacked infrastructure, with roads in very bad repair and no piped water to housing. Collection of refuse is sporadic resulting in the 'tipping' of rubbish in streams and streets; latrines are inadequate and flooding during monsoon season adds to health risks[2] Education in Tanzania is compulsory at the primary level and the medium of instruction in government schools is Kiswahili. Primary school fees were eliminated in 2002 followed by secondary school fees in 2015. Currently children are required to pass the Primary School Leaving Examination at the end of Standard VII to gain entry into a public secondary school. Dar es Salaam has the highest pass rate for this leaving examination in the country at around 70% (Kassile, 2014).

2.2. Participants

All grade 4 and 5 students in 17 opportunistically sampled government schools participated in this project (1857). No student declined participation however the children were told they could withdraw from the process at any time. This age group of pupils was targeted to allow for a follow up study and longitudinal research with the same population. These primary school students were asked to complete a questionnaire as well as undertake tests as part of an ESRC funded project, which looked to identify high potential children living in poverty. All students and their parents were informed through their schools that the purpose of the assessment exercise was to assess the strengths or talent areas of the students, that participation was voluntary, and that the results of the assessment would be kept strictly confidential and for research use only. All class teachers (form tutors) completed a teacher questionnaire, 24 in total, one quarter being male. These teachers taught their class in at least one subject area and would have been responsible for their class for a minimum of six months prior to the data gathering. The number of years a teacher had been at a particular primary school (mean and median 11 years, mode 12 years) would imply the teacher could have been aware of the grade 4 and 5 students for all of their primary education. Data were gathered on the 17 government schools in the sample, these included pupil and teacher numbers, facilities (library, playground, computers, musical instruments, desk, chairs, CCTV, electricity) and the numbers of boys and girls in the class and in the whole school.

2.3. Measures

Students in groups of 40–50 completed a series of tests and a questionnaire. Tests included one of three IQ tests.[3] standardised to UK norms, mathematics, English reading and Kiswahili tests. In order to address issues around cross cultural transportability of tests, pilots were carried out in Morogoro schools, west of Dar es Salaam. Changes were made after the pilots through discussions and in collaboration with local Tanzanian teachers. The questionnaire included a set of background questions, thoughts around and nomination of high ability pupils in the same class, and a self-perception questionnaire, the *Student Multiple Intelligences Profile* (SMIP)[4] The study also included a teacher questionnaire and a teacher semi structured interview carried out with each class teacher (24 in total for each). Regarding the teacher interviews, questions around the meaning, the identification process and the cultural/social contextual beliefs around ability made up the core of the semi-structured interview. An inventory of school facilities was gathered through an observation schedule as well as a school questionnaire.

2.4. Procedure

Testing took place within the children's own class in their own school, and occurred in the morning for all participants. Education Masters students from the University College Dar es Salaam administered the tests. They had been given special training by the research principal and co-investigators specifically for the project. The training was carried out over a two-day period specifically focusing on the research protocols and their administration. The principal investigator, co investigators and research associates from the UK were present at all times in each school that participated in order to oversee the data collection. This overall testing and interview procedures in each school lasted for about 3 hours.

[2] http://www.unicef.org/tanzania/Advocacy_brief_Kinondoni.pdf.

[3] Discussion around the use of the three IQ tests is reported elsewhere (Humble, Dixon, & Schagen, 2017) and children were randomly allocated one of the three tests – Ravens Standard Progressive Matrices, Wechsler Abbreviated Scale of Intelligence – Second Edition (WASI-II) or the Naglieri Nonverbal Ability test NNAT-2. The literature around the use of conventional intellectual ability tests with Black Africans living in developing contexts show average IQ scores to be below 70 (Lynn, 2003; Lynn & Vanhanen, 2002, 2006); with systematic literature reviews stating only slightly higher at around 78 (Wicherts, Dolan, & van der Maas, 2009, Wicherts, Dolan, Carlson, & Van der Maas, 2010). Our results therefore do not show any disagreement with the literature. This data is part of a larger project to investigate static and dynamic testing in developing settings.

[4] The SMIP is studied in more detail using exploratory and confirmatory factor analysis in a recently published paper (Dixon, Humble, & Chan, 2016).

Table 1
Descriptive statistics of the data set.

	N	Min	Max	Mean	S.D	Υ_1	B_2
IQ standardised score	1848	40	120	67.86	14.41	0.42	−0.45
English reading score	1848	69	124	75.65	8.77	1.89	4.64
Mathematics score	1857	0	29	19.64	4.78	−0.77	0.71
Kiswahili score	1854	0	10	5.03	1.82	−0.23	0.14
Age in years	1857	7.9	19.9	11.04	1.16	0.90	2.20
No. of brothers and sisters	1857	0	14	3.25	2.69	2.70	13.60
Father education level	1857	1	6	3.37	1.45	0.63	−0.60
Mother education level	1857	1	6	3.14	1.33	0.06	0.06
Teacher years of experience	24	1	23	11.62	5.97	0.62	−0.51
Teacher Qualifications	24	2	5	3.07	0.60	1.85	5.07
Age of the teacher	24	30	59	45.90	9.35	−0.25	−1.32
Pupil/teacher ratio	17	13.1	43.2	32.01	9.06	−0.49	−1.00
Average age of class	17	10.46	12.67	11.04	0.41	1.32	3.00

Υ_1 = Skewness, β_2 = Kurtosis.

3. Data and empirical model

3.1. Empirical model

The empirical model used for this research builds upon human capital and household production theory which link the educational attainment of children to the backgrounds of their parents, family resources and socioeconomic factors (Becker, 1993). Since the Coleman report (Coleman et al., 1966) theoretical models have associated student attainment with observable characteristics of teachers and schools, including class size, teacher education and teacher experience (Rivkin, Hanushek, & Kain, 2005). Linear and logistic regression is used to estimate the following equation:

$$\mathbf{y_i} = \boldsymbol{\alpha} + \beta\mathbf{D_i} + \gamma\mathbf{P_i} + \boldsymbol{\varepsilon_i}$$

$\mathbf{D_i}$ is the vector controlling for household, parent and child demographic characteristics. These include gender, age, birth order, English fluency, family size, parental education and three wealth factors for child i. $\mathbf{P_i}$ is the vector of school characteristics including teacher characteristics, school facilities, class size and $\boldsymbol{\varepsilon_i}$ is the unobserved factors. $\mathbf{y_i}$ is the dependent vector variable – in the linear regression student outcomes and in the logistic regression an identifier. By estimating this model it is tested whether family factors and observable characteristics of teachers and schools affect student attainment or identification.

3.2. Descriptive statistics

Table 1 below provides descriptive statistics around the test scores as well as family and school characteristics. A description of the variables used in the regression analysis is found in Table 2.

3.3. Data reduction

As this dataset contained a relatively large number of variables, many of the background variables are likely to be highly correlated with each other. This type of multicollinearity can lead to erratic or spurious results, and needs to be dealt with using a data reduction technique, which ensures, as far as possible, that background variables are not highly correlated with each other. A data reduction strategy based on rotated principal factor analysis was therefore adopted, and this is described in more detail below.

This research used an adapted version of Chan's model of SMIP, a self-report checklist designed to assess student strengths in each of Gardner's intelligences (Chan, 2006; Gardner, 1983). The pupil questionnaire included 22 items asking the pupils to describe themselves, on a 5-point scale ranging from 1 ('least like me') to 5 ('most like me'). Exploratory factor analysis of these items indicated that a two-factor model explained 22% of the variance. The table below shows rotated factor loadings for this model, with loadings less than 0.3 blanked for clarity (Table 3).

From the above, it is clear that the first factor (Factor 1) is related to having a self-confident and outgoing personality and a positive attitude towards learning (reading, writing and numbers). The second factor (Factor 2) has some overlapping items, but mainly relates to being musical and dexterous. Factor scores were estimated for each pupil, and standardised to have a mean of 50 and standard deviation of 10.[5] Only Factor 1 is used in subsequent analysis owing to the focus of the paper around self confidence and attitudes to learning.

[5] Standardizing using a T-score which is a shifted Z score scaled to have a mean of 50 and a standard deviation of 10. Exploratory factor analysis gives the factor scores as standardised to reflect a z-score (see DiStefano, Zhu, & Mindrila, 2009; Gorsuch, 1983).

Table 2
List of variables.

Variable name	Label
peer15	Identified by at least 15% of your peers as high ability (0/1)
tiden	Identified by the teacher as high ability (0/1)
top15	In the top 15% on combined test scores (0/1)
selffind	Self confident and a positive attitude to learning, reading, writing and math (0/1)
IQss	IQ standardised score
readss	English reading standardised score
maths	Mathematics score
Kiswahili	Kiswahili score
ptr	Pupil teacher ratio
schfact1	The school has a playground, TV and a computer
schfact2	The school has desks, chairs and musical instruments
teacherage	The teacher's age
avage	Average age in the class
teachex	Teacher years of experience
teachqual	Teacher qualifications
gender	Child's gender (girl = 1)
age	Child's age
eldest	The child is the eldest child in the family (0/1)
englisw	A member of the family is fluent in English (0/1)
brosis	Number of brothers and sisters
fathered	The father's education level
mothered	The mother's education level
wealth	Wealth as determined by a wealth index
amenities	The family home has indoor amenities (i.e., toilet, gas stove)
electric	The family home has electricity in the home.

Table 3
Exploratory factor analysis of SMIP.

Item	Factor 1	Factor 2
I enjoy talking and playing with words		
I enjoy writing: I am fluent and expressive	0.377	
I read a lot for pleasure	0.448	
I sing and hum a lot		
I enjoy listening to music		
I play an instrument		0.442
I actively search for patterns		0.389
I collect categorize and study things		
I play with numbers	0.576	
I remember landmarks	0.411	
I know directions	0.316	0.370
I enjoy drawing	0.376	0.303
I handle objects skilfully		0.359
I understand and like myself	0.584	
I am self-confident	0.565	
I show understanding and appreciation to others	0.414	
I am kind and loving and caring	0.585	
I listen and respect others' feelings	0.451	
I like to make friends	0.645	
I derive a lot of pleasure from looking at natural phenomena	0.517	
I have a hobby that involves nature	0.301	0.331
I love to watch birds or animals		

Before fitting a model to predict test scores from pupil background factors, it was necessary to collapse some of them into a smaller set of combined factors. Otherwise there would be too many independent variables to fit a sensible model to the data. The pupil questionnaire asked a number of questions around family possessions and their home environment. These have been combined into a smaller set of measures using principal factor analysis, rotated using the Varimax procedure. A 3-factor solution was found to be optimal. The table below shows the rotated factor loadings for the factors on the initial variables – loadings less than 0.3 in absolute value have been omitted for clarity of interpretation (Table 4).

The combined factors were given the following descriptions:

Factor 1 – **wealth:** The quantity of material goods a family possesses;

Factor 2 – **amenities:** The family home has indoor amenities (i.e., toilet and gas stove);

Table 4
Rotated factor loadings for pupil background factors.

Variables	Factor 1	Factor 2	Factor 3
The family owns a car or jeep	0.428		
The family owns a scooter or motorcycle	0.467		
The family owns a bicycle	0.398		
The family owns a cell/mobile			
The family owns a radio			
The family has electricity			0.775
The family has a TV			0.685
The family has a gas stove	0.375		
The family owns land	0.354		
The family owns a taxi	0.578		
The family has a computer	0.466		
The family has a generator	0.552		
The family has a market stall or plot of land	0.358		
Number of rooms in the family home			
Type of building in the home			
The toilet is inside the premises		0.971	
The toilet is outside the premises		−0.937	
The house has a separate kitchen			

Factor 3 – **electric**: The family has mains electricity and a TV.

These three factors explain 29% of the variation in this set of data. Factor scores were derived for each pupil, and standardised to a mean of 50 and standard deviation of 10. This principal factor analysis technique was also used to reduce the number of school factors to collapse them into a smaller set of combined factors. The school-level data collected yielded two factors:

- **schfact1**: The school has a playground, TV and a computer
- **schfact2**: The school has desks, chairs and musical instruments.

Again factor scores were standardised to a mean of 50 and standard deviation of 10.

These pupil and school factor scores were used as independent variables in the modelling which follows along with those as set out in Table 2.

4. Results

4.1. Background

Of the 1857 children 64% were Muslim and 36% Christian, 52% were girls and the mean age was 11 years (standard deviation 1.1 years). Just over half of the children lived in a family where an elder member could speak or write English fluently. Regarding possessions, 91% of the families owned a mobile phone, about half the homes had a separate kitchen, 44% had a toilet outside the premises. The great majority of the fathers had an income (90%) with around two thirds of the mothers also in work. Regarding the research participants, the average number of people living in the 'household' was nine. Regarding the father's employment, the largest category was 'cleaner or helper' followed by 'market trader' and 'service worker'. One third of the father's had either no schooling or primary only. Half of the mothers were cleaners or helpers with around one third having no education at all.

4.2. Teacher and pupil nomination

Pupils and teachers were asked to nominate three children in their class they believed were high ability in order to explore the first research question:

- How closely do the teachers' identification of high ability children correspond to test scores?

In total the pupils and teachers nominated 73 children. However the peers and teachers only agreed on the identification of 19 out of the 73. The Cohen's kappa measure of exact agreement is highly significant at 0.398 ($\chi^2(1) = 294.512$, $p < 0.001$), but only indicates fair agreement between teacher and pupil identification (Altman, 1999).

Average test scores for pupils identified by teachers and those who were not, are given in the table below. All of the mean scores for those 'not identified' by the teacher are statistically significantly lower than those 'identified' (Table 5).

Table 5
Comparison of teacher identification with test results.

Test	Teacher identification	Mean	Std. Dev	Hedges' d Effect size
IQ standardised score	Not Identified	67.55	14.249	0.84
	Identified	79.53	15.767	
	Total	67.86	14.409	
Standardised reading score	Not Identified	75.34	8.393	1.42
	Identified	87.51	13.577	
	Total	75.65	8.770	
Mathematics score	Not Identified	19.54	4.769	0.87
	Identified	23.66	3.325	
	Total	19.64	4.782	
Kiswahili score	Not Identified	4.99	1.805	0.78
	Identified	6.40	1.753	
	Total	5.03	1.817	

$t_{IQ}(1846) = -5.674$, $p < 0.001$. $t_{Read}(46.922) = -6.113$, $p < 0.001$. $t_{tmaths}(51.043) = -8.275$, $p < 0.001$. $t_{Kisw}(1852) = -5.303$, $p < 0.001$.

The final column, labelled 'Effect size' (Hedges' d), is a dimensionless measure of the difference in average test scores between those identified as high ability and the rest. It is equal to the difference in mean scores as a fraction of the overall score standard deviation. The highest value is for the reading score, but values for other tests are also high.

Looking at peer identification of high ability, in all cases there is an increasing trend in average scores relative to the percentage of peers identifying a pupil. The effect sizes are similar to those for teacher identification (Table 6).

Semi-structured interviews also addressed the issues around ability. What seems very important regarding an impact on children's ability as far as the teachers were concerned was family background. For example one teacher stated that 'it's right from birth which parents assist them and if the parents are keen enough'. Others believed that 'family background matters', 'family has got an impact', and ability is 'inherited from parents'. It's typically those from better families who show ability in that 'the ones who come from a poor family somehow will not do as well as the ones who come from the less poor family'. The child's environment plays a big part too where poor illiterate parents have a negative impact as stated by one teacher:

> 'it's about the community, yeh, the community surrounding us, especially the parents . . . they are having a negative perception . . . it is because they did not go to school or their level of education'.

This level of education crops up again when one teacher talks about parents who are 'uneducated' and these parents do 'not try with their children. They will not ask what they are doing at school as they are so ignorant'.

Teachers also believed that children who are high ability show 'special understanding' and show 'extra mental abilities'. They carry out 'exercises in the class rapidly and concentrate'. In some cases these children 'can be used to help other less talented children' and become 'group leaders to help with the class'.

Regarding gender, the main consensus from the interviews was that girls at this age will be of a higher ability than boys 'as girls concentrate . . . and do not waste time playing'. Girls 'pay much more attention to you as a teacher', 'are more committed', and 'even when you are posting the results of the exams, you know it's the girls who are checking from the top numbers'.

Table 6
Comparison of Peer identification with test results.

Test	Peer identification	Mean	Std. Deviation	Hedges' d Effect size
IQ standardised score	Not identified	67.59	14.23	0.78
	Identified	78.67	17.282	
	Total	67.86	14.409	
Standardised reading score	Not identified	75.41	8.515	1.14
	Identified	85.22	12.781	
	Total	75.65	8.770	
Maths score	Not identified	19.55	4.767	0.83
	Identified	23.51	3.659	
	Total	19.64	4.782	
Kiswahili score	Not identified	4.99	1.809	0.74
	Identified	6.33	1.665	
	Total	5.03	1.817	

$t_{IQ}(1846) = -5.130$, $p < 0.001$. $t_{Read}(44.980) = -5.119$, $p < 0.001$. $t_{tmaths}(47.785) = -7.115$, $p < 0.001$. $t_{Kisw}(1852) = -4.913$, $p < 0.001$.

Table 7
Family and school characteristics and the likelihood of identification.

	Tiden			Peer 15			Top 15			Selfind		
Independent variable	B	SE	$\hat{OR}$	B	SE	$\hat{OR}$	B	SE	$\hat{OR}$	B	SE	$\hat{OR}$
ptr	−0.044	0.016	0.644**				−0.047	0.008	0.625**			
schfact1										−0.037	0.009	0.691**
schfact2										−0.048	0.008	0.619**
teachergender							−0.476	0.185	0.622**	−1.173	0.158	0.309**
avage										−0.905	0.175	0.690**
teachex				−0.029	0.013	0.748*				−0.039	0.007	0.677**
teachqual							−0.015	0.007	0.861*	−0.025	0.007	0.779**
gender (girl)										0.427	0.123	1.532**
age							−0.376	0.068	0.645**			
eldest	−0.757	0.360	0.469*				−0.568	0.170	0.567**			
youngest							−0.607	0.168	0.545**			
englisw												
brotherenglish										0.355	0.163	1.154*
brosis										0.048	0.021	1.138*
maleincome												
femaleincome												
fathered												
mothered												
wealth												
amenities												
electric							0.041	0.009	1.507**	0.013	0.006	1.013*
No. of obs.		1857			1857			1857			1857	
−2 Log-likelihood		425.771			531.436			1397.938			1708.370	
Wald χ^2 (p-value)		12.63			5.27			113.41			160.06	
		(0.002)			(0.022)			(0.000)			(0.000)	

Unstandardised coefficients (B), robust standard errors (SE), and odds ratio ($\hat{OR}$) = exp[SDx Coeff.].
* $p < 0.05$.
** $p < 0.01$.

4.3. Logistic regression modelling results

Logistic regression is used in this part of the paper to explore the second of the research questions:

- Does the likelihood of being identified as being high ability in a school context vary according to family background and school characteristics?

The logistic modelling approach was applied to four indicators of ability:

1. **Tiden**: identified by teacher as high ability;
2. **Peer15**: identified by more that 15% of peers as high ability;
3. **Top15**: in top 15% on combined test score. This indicator provides a single scale combined scored created by combining IQ standardised score, reading standardised score, math and Kiswahili using principle component analysis;
4. **Selfind**: identified by self-completion questionnaire. The top 20% of the children in the factor relating to self-confidence and positive attitude to learning reading, writing and mathematics using Factor 1 from the SMIP.

Table 7 summarises the results of the modelling in terms of significant coefficients for each variable expressed as an odds ratio (Hosmer, Lemeshow, & Sturdivant, 2013). The ordinary modelling used a 'step up' approach, in which significant variable were added to an initial null model. The first value is the unstandardized coefficient (B), the second is the standard error (SE) and the third is the significant odds ratios ($\hat{OR}$) for the given background variable (shown in the row heading) against the binary outcome (shown in the column heading). Blank cells in the table are variables where the odds ratio is not significant at the 5% level.[6]

Two independent variables have a significant effect on the likelihood that the teacher will identify a child as high ability. If the child is in a large class (higher pupil/teacher ratio) or they are the eldest in their family, then there is less likelihood of the

[6] For continuous independent variables the odds ratio is exp[SDx Coeff.]. This gives an estimated odds ratio for an increase of 1 SD. Where a 1 standard deviation is a meaningful change in the respective continuous variable. Within this definition the dichotomous variables were taken to have an standard deviation of 1, giving the odds ratio of exp[Coeff.].

teacher identifying them. It would come as no surprise that being a pupil in a larger class reduces the likelihood of identification.

Only one independent variable has a significant effect on the likelihood that a peer identifies a child. The more experienced the teacher (number of years teaching) then the less likely your classmates will identify you.

There are seven independent variables that have a significant effect on the likelihood that you will be in the top 15% of test scores. In terms of negative factors it is interesting that the better your teacher's qualifications, if the teacher is female and your class is larger then the less likely you are to be in this subset of children. Being older or the eldest or youngest in the family again negatively affects the likelihood to be identified in this category. The only positive factor is the provision of electricity in the home where living in a home with electricity implies 1.507 times more likely to be in the top 15% of test scores.

Looking at the children's own self-confidence, there are a number of negative factors. Three teacher variables are included here: gender, qualifications and experience. The more experience and qualifications your teacher has and if they are female the less likely you are to define yourself as very self-confident. Other negative relationships are with both school factors (TV/computer, desks/musical instruments) and average class age. Looking at the positive independent variables, if you are a girl, the more brothers and sisters you have, if someone in the family can speak English and if there is electricity in the home the more likely you are to identify yourself as self-confident. The multiplying factor for gender is 1.532. This means that you are 1.532 times more likely to report being self-confident if you are a girl as opposed to a boy, all other factors being equal. This might be regarded as surprising from a western cultural perspective, and could be worth further research into the factors which appear to make girls more likely to be identified based on their own self-confidence.

4.4. Linear regression modelling results

Initially multilevel modelling was used to investigate variance in attainment across the 17 government schools. The findings of this modelling showed there to be no statistically significant variance across the schools concerning test scores, family background and school factors. Therefore linear regression was used to explore the third research question:

- How much variation in attainment is seen across schools and how much of the variation is associated with pupil and school characteristics?

Linear modelling was applied to the four different score outcomes:

- **IQss** – IQ standardised score;
- **Readss** – Reading standardised score;
- **Maths** – Mathematics score;
- **Kiscore** – Kiswahili score.

Looking at how the children's test scores correlate shows as would be expected, that there is a positive significant correlation between all of the test outcomes (see table below) (Table 8).

Table 9 shows the results for linear modelling of test scores, using the same set of background variables used in the logistic regression set out above. In addition to the unstandardized coefficients (B) and robust standard errors (SE) the table shows standardised beta values, which indicate the number of standard deviations that a dependant variable will change as a result of one standard deviation change in the independent variable.

Regarding the children themselves, the linear modelling highlights the fact that age and your position in the family can have a negative impact on different score outcomes. If you are the youngest or oldest in the family you are less likely to perform well on all of the tests. Regarding age the older the child, the greater the likelihood that they will score lower in all tests apart from Kiswahili. Girls are more likely to perform better on Kiswahili tests but less likely to gain a higher IQ score.

Taking the class as a 'whole' then the pupils' average age is positively related to reading scores but negatively to mathematics.

Your teacher's qualifications are positively related to your IQ and reading score, but negatively to mathematics and Kiswahili scores. Teacher experience negatively affects all scores apart from Kiswahili. Female teachers are negatively related to IQ and mathematics scores.

Table 8
Correlations of test scores.

	Standardised scores for IQ test	Standardised reading score	maths score
Standardised scores for IQ test			
Standardised reading score	0.314[a]		
maths score	0.361[a]	0.333[a]	
Kiswahili score	0.285[a]	0.295[a]	0.368[a]

[a] Correlation is significant at the 0.01 level (2-tailed).

Table 9
The effects of family and school characteristics on student outcomes.

Independent variable	IQ score			Reading score			Mathematics score			Kiswahili score		
	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta
ptr	−0.334	0.058	−0.211**							−0.023	0.005	−0.155**
schfact1	−0.142	0.034	−0.090**				−0.055	0.011	−0.114**			
schfact2	−0.126	0.034	−0.084**							−0.014	0.004	−0.059*
teachergender	−5.258	0.899	−0.135**				−0.959	0.304	−0.078**			
avage				1.193	0.505	0.060*	−0.810	0.284	−0.058*			
teachex	−0.141	0.054	−0.094**	−0.114	0.019	−0.103**	−0.087	0.011	−0.199**			
teachqual	0.084	0.034	0.057*	0.054	0.020	0.061**	−0.089	0.011	−0.176**	−0.010	0.004	−0.050*
gender (girl)	−2.716	0.630	−0.094**							0.189	0.082	0.053*
age	−2.077	0.275	−0.172**	−2.167	01.78	−0.287**	−0.247	0.096	−0.071**			
eldest	−2.428	0.806	−0.084**	−1.470	0.500	−0.085**	−0.975	0.269	−0.097**	−0.540	0.106	−0.147**
youngest	−3.079	0.795	−0.102**	−0.918	0.493	−0.055*	−1.180	0.265	−0.121**	−0.383	0.105	−0.103**
englisw												
brotherenglish							0.671	0.263	0.052*			
brosis												
maleincome												
femaleincome												
fathered							0.124	0.076	0.062**			
mothered												
wealth	−0.080	0.032	−0.054*				−0.029	0.011	−0.059**	−0.013	0.004	−0.075**
amenities												
electric	0.139	0.032	0.099**	0.085	0.020	0.095**	0.077	0.011	0.164**	0.021	0.004	0.118**
Constant	122.018**			83.957**			40.014**			6.884**		
N	1847			1847			1856			1853		
R^2	0.145			0.105			0.132			0.056		
F (p-value)	25.94			30.73			23.37			13.78		
	(0.000)			(0.000)			(0.000)			(0.000)		

Unstandardised coefficients (B), robust standard errors (SE). and standardised Coefficients (Beta).
* $p < 0.05$.
** $p < 0.01$.

Three background variable are shown to be significant, wealth, having electricity in the home and father's level of education. Having electricity positively implies you are more likely to perform well on all tests, if your father has a higher level of education then this increases the likelihood of a higher test score in mathematics and a higher wealth indicator has a negative effect on all scores apart from reading.

5. Discussion

The analysis of this data has helped to illuminate the complex interplay of school and family factors that relate to pupil achievement and identification as high ability. This research set out to answer three questions:

- How closely do the teachers' identification of high ability children correspond to test scores?
- Does the likelihood of being identified as being high ability in a school context vary according to family background and school characteristics?
- How much variation in attainment is seen across schools and how much of the variation is associated with pupil and school characteristics?

The following discussion considers each in turn. First, teacher identification shows that children's test scores are highly correlated with nomination, reading having the highest effect size (Table 5). The literature agrees that teachers focus on reading when identifying children for advancement programmes (Hernández-Torrano et al., 2013; Hodge & Kemp, 2006; Siegle et al., 2010). Teacher interviews supported this point around reading. They often spoke about children who could help others in the class and act as leaders when the teacher left the class unattended, which typically implies standing at the front reading. The teacher interviews also highlighted the belief that family background and environment was important, having an impact on the child's ability. This seems to support the literature that shows school stakeholders' preconceived ideas around first generation learners and their incapacity for possessing talent (Dixon, 2012; Frasier, 1987; Humble, 2015; Iyer & Nayak, 2009). This research supports the finding that some teachers believe that high ability students come from wealthier families (Humble, 2015; Worrell, 2007; Wyner et al., 2007). The teacher interviews also suggested that teachers believed that girls 'at this age' were more likely to be focused on their studies than boys owing to their commitment. This is partly supported from the logistic regression analysis, which shows that girls have a higher likelihood of being self confident with a positive attitude to learning and more likely to score more highly in Kiswahili. Teachers tend to agree with peer identification

and vice versa as shown in the literature (Blackshear, 1979; Kaya, 2013). This research provides no indication that peers nominate their friends as suggest by Heyman and Dweck (1998).

Second, the logistic regression that explores question two shows that being a girl, having a larger family and having family members that can speak English increases the likelihood of children to report themselves as self-confident and having a positive attitude towards learning (reading, writing and numbers). In a study of Zambian school children, girls also rated themselves more highly than boys (Furnham & Akande, 2004). All school factors have a significant negative likelihood on the reporting of self-confidence and positive attitude. For example, the more experienced your teacher the less likely you are to identify yourself as confident and positive towards learning. Irrespective of the facilities the school possesses (i.e., playground, TV and computer/desk, chairs, musical instruments), there is a negative relationship with this indicator. Wealth indicators seem in general (apart from having electricity in the home) to have no relationship on self-identification, disagreeing with the findings in other literature (Aldridge et al., 1999; Gwirayi & Shumba, 2007).

Turning now to the third research question, when looking at test scores there is either no relationship or a negative relationship to family wealth factors – wealth, female and male income – only one factor, electric, is significantly and positively related to all of the scores. This tends to agree with some of the literature, which states that achievement is not dependent on income, but the quality of home life and time parents spend with their children (Bradley et al., 1987; Coleman, 1969; Murphy, 1986; Rosenbaum et al., 1987). This study however cannot verify the amount of time children and parents spend together or the quality of home life. Home environment is not significantly related to reading scores. Reading ability is also not related to someone in the family being able to speak or read English. This result therefore does not coincide with the findings of Aikens and Barbarin (2008) who state that poor children's literacy development is influenced by parental and home involvement.

This paper set out part of a research project that looked at the ability and self confidence of children living in poor areas of Dar es Salaam, Tanzania. It has become apparent when teachers are asked about ability they tend to recognise this through test taking or lesson learning capability. Also teacher qualifications and experience negatively affect children's self confidence and attitude to learning. Therefore regarding policy implications, it would seem that it might be beneficial for teachers to have the opportunity through teacher training initiatives to explore other ideas of what ability might mean in such cultural settings. This could include looking at children's task commitment and creativity. Secondly, changing school policy through interventions that focus on children's creativity, motivation, and interests would show teachers and governments how different practices, moving away from rote, can stimulate learning. This could be done through student centred inquiry and project based learning (Renzulli & Reis, 2014). Opportunities would be given to students to apply, deepen and extend their learning through stimulating projects and tasks that engage students – they think, reason, evaluate and create. Such an intervention could transform potential into real talents, thus improving the prospects for societies and nations to capitalise on currently underutilised or unrecognised cognitive skills and therefore human capital.

This research highlights several interesting areas and therefore ways forward for this type of research. Further investigation could take place around the time children spend in the family home and the involvement they have with their parents. Future work in poor urban settings in sub-Saharan Africa could benefit from exploring the intricate interplay of school environments, teacher beliefs and children's self confidence.

Disclosure statement

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article

Funding

The author(s) received funding from the Economic and Social Research Council (ESRC) (ES/K011987/1) for the research.

References

Aikens, N. L., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology*, *100*, 235–251.

Aldridge, J. M., Huang, T., & Fraser, B. J. (1999). Investigating classroom environments in Taiwan and Australia with multiple research methods. *Journal of Educational Research*, *93*(1), 48–61.

Altman, D. G. (1999). *Practical statistics for medical research*. New York, NY: Chapman & Hall/CRC Press.

Baker, J., Grant, S., & Morlock, L. (2008). The teacher–student relationship as a developmental context for children with internalizing or externalizing behavior problems. *School Psychology Quarterly*, *23*(1), 3–15.

Becker, G. (1993). *Human Capital: A theoretical and empirical analysis with special reference to education*. Chicago: University of Chicago Press.

Bernal, E. M. (2002). Three ways to achieve a more equitable representation of culturally and linguistically different students in GT programs. *Roeper Review*, *24*, 82–88.

Blackshear, P. B. (1979). A comparison of peer nomination and teacher nomination in the identification of the academically gifted, black, primary level student. *Diss Abstr. Int.*, *40*, 5A.

Bloom, B. S. (Ed.), (1985). *Developing talent in young people*. New York: Ballantine Books.

Borland, J. H., & Wright, L. (1994). Identifying Young, Potentially Gifted, Economically Disadvantaged Students. *Gifted Child Quarterly*, *38*(4), 164–171.

Bradley, R. H., & Corwyn, R. F. (2002). Socio-economic status and child development. *Annual Review of Psychology*, *53*, 371–399.

Bradley, R. H., Rock, S. L., Caldwell, B. M., Harris, P. T., & Hamrick, H. M. (1987). Home environment and school performance among black elementary school children. *Journal of Negro Education*, *56*(4), 499–509.

Card, D., & Giuliano, L. (2013). *Does gifted education work? For whom? (Working Paper)*. Berkeley: University of California.
Chan, D. W. (2006). Perceived multiple intelligences among male and female chinese gifted students in Hong Kong: The structure of the student multiple intelligences profile. *Gifted Child Quarterly*, *50*(4), 325–338. http://dx.doi.org/10.1177/001698620605000405.
Chireshe, R., & Shumba, A. (2011). Teaching as a profession in Zimbabwe: Are teachers facing a motivation crisis? *Journal of Social Sciences*, *28*(2), 113–118.
Coleman, J. S., Campbell, E. Q., Hobson, C. J., Mc Partland, J., Mood, A. M., Weinfeld, F. D., et al. (1966). *Equality of educational opportunity*. Washington, DC: U.S: Government Printing Office.
Coleman, A. B. (1969). The disadvantaged child who is successful in school. *The Educational Forum*, *32*(1), 95–97.
DiStefano, C., Zhu, M., & Mindrila, D. (2009). Understanding and using factor scores: Considerations for the applied research. *Practical Assessment Research and Evaluation*, *14*(10), 1–11.
Dixon, P., Humble, S., & Counihan, C. (2015). *Handbook of international development and education*. Cheltenham, Gloucester and Northampton, MA: Edward Elgar.
Dixon, P., Humble, S., & Chan, D. (2016). How children living in poor areas of Dar es Salaam, Tanzania perceive their own multiple intelligences. *Oxford Review of Education*, *42*(2), 230–248.
Dixon, P. (2012). *International aid and private schools for the poor: Smiles, miracles and markets*. Cheltenham, Gloucester and Northampton, MA: Edward Elgar.
Frasier, M. M. (1987). The identification of gifted black students: Developing new perspectives. *Journal for Education of the Gifted*, *10*(3), 155–180.
Furnham, A., & Akande, A. (2004). African parents' estimates of their own and their children's multiple intelligences. *Current Psychology: Developmental, Learning, Personality, Social*, *22*, 281–294.
Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York, NY: Basic Books.
Gorsuch, R. (1983). *Factor analysis*. Hillsdale, NJ: L. Erlbaum Associates.
Gottfried, A. W., Gottfried, A. E., Bathurst, K., & Guerin, D. W. (1994). *Gifted IQ: Early developmental aspects: The Fullerton longitudinal study*. New York, NY: Plenum Press.
Gwirayi, P., & Shumba, A. (2007). A Preliminary study of the relationship between students' self–concept and academic achievement in Zimbabwe. *Journal of Psychology in Africa*, *17*(1), 119–122.
Hernández-Torrano, D., Prieto, M. D., Ferrándiz, C., Bermejo, R., & Sáinz, M. (2013). Characteristics leading teachers to nominate secondary students as gifted in Spain. *Gifted Child Quarterly*, *57*(3), 181–196.
Heyman, G. D., & Dweck, C. S. (1998). Children's thinking about traits: Implications for judgements of the self and others. *Child Development*, *69*, 392–403.
Hodge, K. A., & Kemp, C. R. (2006). Recognition of giftedness in the early years of school: Perspectives of teachers, parents and children. *Journal of Education of the Gifted*, *30*, 164–204.
Hosmer, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). *Applied logistic regression*, (3rd ed.) Toronto: John Wiley and Sons Inc.
Humble, S. (2015). In search of human capital −identifying gifted children in poor areas of Dar Es Salaam, Tanzania. In P. Dixon, S. Humble, & C. Counihan (Eds.), *Handbook of international development and education* (pp. 343–367). Cheltenham, Gloucester, UK and Northampton, MA USA: Edward Elgar.
Humble, S., Dixon, P., & Schagen, S. (2017). Assessing intellectual potential in Tanzanian children in poor areas of Dar es Salaam, Assessment in Education: Principles. *Policy and Practice*Epub ahead of print.
Iyer, G., & Nayak, A. (2009). *The quality of school education in Bhutan: Reality and opportunities*. Government of Bhutan, Ministry of Education.
Kamper, G. D., & Mampuru, M. E. (2007). School success against high poverty: Some key considerations. *Journal for New Generation Science*, *5*(1), 44–58.
Kamper, G. (2008). A profile of effective leadership in some South African high-poverty schools. *South African Journal of Education*, *28*, 1–18.
Kassile, T. (2014). Pass rates in primary school leaving examination in Tanzania: Implication for efficient allocation of resources. *South African Journal of Education*, *34*(2), 1–21.
Kay, K. (2000). *Uniquely gifted: Identifying and meeting the needs of the twice exceptional student*. Gilsum, NH: Avocus Publishing Inc.
Kaya, F. (2013). The role of peer nomination forms in the identification of lower elementary gifted and talented students. *Educational Research and Reviews*, *8*(24), 2260–2269. http://dx.doi.org/10.5897/err2013.1674.
Kremer, M., Muralidharan, K., Chaudhury, N., Hammer, J., & Halsey Rogers, F. (2006). Missing in action: Teachers and health workers absence in developing countries. *Journal of Economic Perspectives*, *20*(1), 91–116.
Lee, S. Y., Matthews, M. S., & Olszewski-Kubilius, P. (2008). A national picture of talent search and talent search educational programs. *Gifted Child Quarterly*, *2*, 55–69.
Leoschut, L. (2009). *Running nowhere fast: Results of the 2008 national youth lifestyle study*. Cape Town: Centre for Justice and Crime Prevention.
Lynn, R., & Vanhanen, T. (2002). *IQ and wealth of nations*. Westport, CT: Praeger.
Lynn, R., & Vanhanen, T. (2006). *IQ and global inequality*. Augusta, GA: Washington Summit Publishers.
Lynn, R. (2003). The geography of intelligence. In H. Nyborg (Ed.), *The scientific study of general intelligence* (pp. 127–146). Oxford: Elsevier Science.
Maree, D. J. F., Maree, M., & Collins, C. (2008). The relationship between hope and goal achievement. *Journal of Psychology in Africa*, *18*(1), 65–74.
Murphy, D. M. (1986). Educational disadvantagement: Associated factors current interventions and implications. *Journal of Negro Education*, *55*(4), 495–507.
O'Connor, E. E., Dearing, E., & Collins, B. A. (2011). Teacher-child relationship and behavior problem trajectories in elementary school. *American Educational Research Journal*, *48*(1), 120–162.
Powers, D. A. (1996). Social background and social context effects on young men's idleness transitions. *Social Science Research*, *25*, 50–72.
Reis, S., & McCoach, D. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted Child Quarterly*, *44*(3), 152–170.
Renzulli, J. S., & Reis, S. M. (2014). *The Schoolwide Enrichment Model: A how to guide for talent development*. Waco Texas: Prufrock Press Inc.
Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers schools and academic achievement. *Econometrica*, *73*(2), 417–458.
Robinson, N. M., Lanzi, R. G., Weinberg, R. A., Ramey, S. L., & Ramey, C. T. (2002). Family factors associated with high academic competence in former Head Start children at third grade. *Gifted Child Quarterly*, *46*, 278–290.
Rosenbaum, J. E., Kuliek, M. J., & Rubinowitz, L. S. (1987). Low-income black children in white suburban schools: A study of school and student responses. *Journal of Negro Education*, *56*(1), 35–52.
Sampson, W. A. (2002). *Black student achievement: How much do family and school really matter?* Lanham, MD: The Scarecrow Press.
Siegle, D., Moore, M., Mann, R. L., & Wilson, H. E. (2010). Factors that influence in-service and pre-service teachers' nominations of students for gifted and talented programmes. *The Journal for the Education of the Gifted*, *33*, 337–360.
Silver, R. B., Measelle, J. R., Armstrong, J. M., & Essex, M. J. (2005). Trajectories of classroom externalizing behavior: Contributions of child characteristics, family characteristics, and the teacher-child relationship during the school transition. *Journal of School Psychology*, *43*(1), 39–60.
Tooley, J. (2009). *The Beautiful Tree: A personal journey into how the world's poorest people are educating themselves*. Washington D.C: CATO Institute.
UNESCO (2011). *Tanzania education sector analysis: Beyond primary education, the quest for balanced and efficient policy choices for human development and economic growth*. Dakar: UNESCO.
Wicherts, J. M., Dolan, C. V., & van der Maas, H. L. J. (2009). A systematic literature review of the average IQ of sub-Saharan Africans. *Intelligence*, *38*, 1–20. http://dx.doi.org/10.1016/j.intell.2009.05.002.
Wicherts, J. M., Dolan, C. V., Carlson, J. S., & Van der Maas, H. L. J. (2010). Raven's test performance of sub-Saharan Africans: Average performance, psychometric properties, and the Flynn Effect. *Learning and Individual Differences*, *20*, 135–151. http://dx.doi.org/10.1016/j.lindif.2009.12.001.
Worrell, F. C. (2007). Identifying and including low-income learners in programs for gifted and talented: Multiple complexities. In J. VanTassel-Baska, & T. Stambaugh (Eds.), *Overlooked gems: A national perspective on low-income promising learners: Conference proceedings from the National Leadership Conference on Low-Income Promising Learners* (pp. 47–51). Washington, DC: National Association for Gifted Children.
Wright, L., & Borland, J. H. (1993). Using early childhood developmental portfolios in the identification and education of young economically disadvantaged potentially gifted students. *Roeper Review*, *15*(4), 205–210.

Wyner, J. S., Bridgeland, J. M., & DiIulio, J. J. Jr. (2007). *Achievement trap: How America is failing millions of high-achieving students from low-income families*. Lansdowne, VA: Jack Kent Cooke Foundation Civic Enterprises.
Zorn, D., & Noga, J. (2004). *Family poverty and its implications for school success issues facing Cincinnati's families: Executive summary*. Cincinnati, OH: University of Cincinnati Evaluation Services Center.